

experiments which seem to point strongly towards a negative answer.

An interesting paper on the respiration of the frog is contributed by Prof. Martin, whose observations strongly suggest a close relationship between the nervous centre which regulates respiration and that which regulates general reflex action, even if the two should not be identical. He discusses the question whether there be two independent, though closely related, nervous centres, one for inspiration and the other for expiration, or whether, as supposed by Budge, there is a single centre from which the muscles of inspiration and those of expiration may receive their innervation according to circumstances. Dr. Martin shows that this latter hypothesis does not hold good for the frog, and that in it there are really two distinct centres, one for inspiration, and one for expiration, each having its own stimulus, and generating its own nervous impulse, which can travel in them only to its own set of muscles quite independently of the resistance opposed to discharge from the other centre.

Those who are interested in the electro-motive properties of muscle will find in this journal an admirable report on this subject by Prof. Burdon Sanderson, in which he gives an account of Hermann's recent work in this department of animal electricity, along with such information both regarding modes of investigation and experimental results as greatly facilitate comprehension of the subject.

A most laborious and fatiguing series of experiments has been made by Mr. North on the effects of starvation with and without severe labour, and on the elimination of urea from the body. These experiments were made upon himself, and, in addition to the personal discomfort produced by a complete abstinence from food, he voluntarily underwent severe exercise upon the treadmill, for the purpose of ascertaining exactly the effect of labour upon the excretion of urea. Flint had found that in the case of Weston, the pedestrian, the excretion of urea was considerably increased during a long walk, and Mr. North's observations go to show that severe exercise does increase the elimination of urea, but the increase is very small, both when the person is fed upon ordinary diet, and when nitrogenous food is entirely withheld. The quantity of urea passed, however, depends largely on the condition of the body at the time, varying according to the greater or smaller reserve of nitrogenous material contained in it, and he thinks that Weston, before entering upon his walk, had accumulated a large reserve, from which the urea he excreted was derived.

The paralysis produced by potash salts when injected into the circulation, is usually ascribed to a special action upon the muscles and heart. Dr. Ringer and Mr. Murrell, however, from a number of experiments on the subject, have come to the conclusion that potash has no special affinity for muscle, but is a protoplasmic poison, having an equal affinity for all protoplasm, and destroying the tissues in the order of their vital endowments.

Mr. Langley has made a number of observations upon the salivary glands, and finds that Nussbaum's supposition that the disappearance of the black colouration produced by osmic acid from the sub-maxillary (?) gland after treatment with glycerine is not due to the removal of ferment from the gland, but to some other cause, and

that furthermore an amylolytic ferment does not exist at all in the sub-maxillary gland of the rabbit. He finds that there is a marked difference between the cat and the dog in regard to the salivary secretion, the sympathetic secreting nerves having a different connection with the gland cells in the two animals, a difference which favours the paralyzing action of atropia in the cat.

The secretion of sweat is now known to be, like that of saliva, directly under the control of the nervous system, and to be excited by secreting nerves, independently of alterations in the vessels which supply secreting glands. Dr. Ott and Mr. Field show that the nerve centres in connection with the sweat glands can be stimulated by the poison muscarine, and that a greater amount of carbonic acid than usual in the circulating blood will also excite functional activity, a fact which would tend to explain the greater tendency to sweat which people observe when they are shut up in a close room, a tendency which appears to be greater than can be readily accounted for by the warmth of the room alone.

These brief observations will give some idea of the variety of physiological subjects discussed in the *Journal of Physiology*, and we heartily congratulate the able editor and his co-operators on the importance and interest of the results set before us in the numbers which have already appeared. We have no doubt that in such competent hands this journal will continue to maintain its high character, and, while absolutely indispensable to all who desire to follow the progress of physiology, it will, we think, do much to diffuse a knowledge of that science amongst general readers.

#### A UNIVERSAL GEOGRAPHY

*Stanford's Compendium of Geography and Travel, based on Hellwald's "Die Erde und ihre Völker."* Africa: Edited and extended by Keith Johnston. Central and South America: Edited and extended by H. W. Bates. With Ethnological Appendices by A. H. Keane, B.A. Maps and Illustrations. (London: Stanford, 1878.)

HELLWALD'S "Die Erde und ihre Völker" is well known in Germany, and has achieved a great popularity. We doubt, however, if a simple translation of Hellwald's work would have been either fair or wise; for though it is written more brilliantly than German works usually are, and although Hellwald himself is a competent geographer, it has several drawbacks which we should have regarded as serious defects had they been permitted to stand in this English edition. For one thing, Hellwald is a violent Anglophobist, and he takes every opportunity of depreciating English travellers or ignoring them altogether. We therefore think it wise in the publisher of the English edition to take the German work simply as a basis on which to found an English work that shall fairly represent the present state of geographical knowledge. The method adopted by the publisher appears to us well adapted to attain the end in view. He has succeeded in obtaining the services of geographers having a special knowledge of the various divisions of the earth of which the several sections of the work treat. These editors, taking the translation of Hellwald as their raw material, go over it, correcting and extending as far as they deem necessary in order to

produce a work which comes up to their standard. Thus Mr. Keith Johnston has dealt with Africa, and Mr. Bates with Central and South America; of the future volumes, Europe will be edited by Prof. Ramsay, North America by Dr. Hayden, the chief of the U. S. Geological Survey, Asia by Col. Yule, and Australasia by Mr. A. R. Wallace. It must be admitted that no more competent men could be found for the parts allotted to them, and judging from the two volumes before us, the "Compendium of Geography and Travel" ought to take its place as a standard authority on geographical knowledge and geographical exploration.

The volume on Africa by Mr. Keith Johnston, who himself will shortly lead an expedition to that much-explored continent, contains a complete account of our knowledge of the "dark continent," up to the date of publication, including the recent discoveries of Mr. Stanley. After a general introduction, each of the principal regions of the continent, from the region of the Atlas southwards, is treated separately, in all its aspects—physical, geological, topographical, ethnological, and biological. It is evident that Mr. Johnston has added largely to the German original; indeed, his volume is two or three times the size of the section of Hellwald's work devoted to Africa. The result is a work which gives a full and satisfactory summary of our present knowledge of perhaps the most interesting continent of the globe. It would, however, be a mistake to imagine that the work is a dry geographical treatise; it reads more like a well-written narrative of travel, and besides its value to all interested in geography as a standard work of reference, it will be found genuinely interesting reading. Mr. Johnston's Notes on the distribution of rain in Africa, illustrated by a series of fourteen rain-charts, are of distinct scientific value. Mr. Keane's Appendix on the African Races is evidently the result of long and conscientious research; and while he possibly makes too much of language *per se* as a test of race, he is evidently master of his subject, and has gathered together in a clear and well-arranged form a mass of information of great ethnological value.

To many, perhaps, the second volume, on Central and South America, edited and to a considerable extent recast by Mr. Bates, will contain more of novelty than the first, treating, as it does, of a region less familiar to the public than Africa. Under the title of Central America the second volume includes not only the smaller states of the isthmus—Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, and British Honduras—but also Mexico proper, the whole forming a region probably upheaved by volcanic agency, and which seems to taper away gradually from north to south. The area of this large district of country exceeds more than five times that of Spain, and would seem to be sufficiently distinct both in a geographical and geological point of view from those broad continental expanses known as North and South America. The highlands of this district form a series of wonderful lofty table-lands, intersected by detached hilly portions and flanked by commanding volcanic peaks. In some places these table-lands rise in terraces one over the other. In others these will be suddenly interrupted by deep intervening valleys of very various forms, sometimes mere chinks, at other times fissures of variable

breadth and upwards of a thousand feet in depth between whose steep rocky walls flow little streamlets. The great mountain-chains culminate in such giant volcanic peaks as Popocatepetl, which is nearly 18,000 feet in height.

In addition to the chapters describing the physical and natural features of this area, and a brief account of its former wondrous greatness, there are chapters on the present inhabitants, and copious information is given as to each of the States. Especially would we note the chapters relating to the population and government of Mexico.

The second division of Mr. Bates's volume is devoted to the West Indian Islands. This large group of islands lying east of Central and north of South America, includes Cuba, Jamaica, Hayti, and the Lesser Antilles. The condensation of this part is carried too far. These islands awaken many memories of the past, not, indeed, of a prehistoric past, like those that cling round Mexico, but as it were of a modern past, with which some of our own island glory is connected, and it would have been well had the editor not only edited, but extended, from the English point of view, Hellwald's notices of Jamaica, Cuba, and Hayti. In an appendix it is true there is a most useful tabulated survey of the principal islands in this group, which gives details of their population, a list of their chief towns, and a short account of the products and industries of each, but what we would have liked would have been to have had all this incorporated in the text, with a short account of the past greatness if any of each of the larger islands.

The third division treats of South America, a well-defined continent, over some portions of which our editor has often wandered, a continent, the greatest in the world for some of its natural wonders, a continent conspicuous for its mighty mountain ranges, for the peculiar way in which these run, which fact in combination with their great height and their vast woody slopes, accounts for their giving birth to so many gushing streamlets which, in their turn uniting, form so many mighty rivers, by which the future greatness of this part of the world will be achieved. The carefully edited chapters of this section read—though not exaggerated in tone—like so many pages from some tale of fairyland. Passes over mountains upon the snow—just on the very line of eternal whiteness with bright flowers and brighter humming-birds, views from these lofty eminences that no words can describe, views of nature in its vastness and its greatness that seem to pain the human soul because it has to confess its inability to take them wholly in. Then the vast steppes or llanos, then those rivers, such as the Amazon and her tributaries, and lastly the volcanoes. Amid all this nature the great towns and the varied peoples of South America are, however, not overlooked, and there are some good woodcuts illustrating the chief features of both scattered through this portion of the volume.

The chapters also on the natural products and resources of the various tribes and people are most interesting, and the statistics seem to prove that the leaven of civilisation is at last beginning to work in the huge human mass.

The chapter on the ethnography and philology of the American continent, by Mr. Keane, covers 100 pages, and seems all but exhaustive; it is accompanied by several maps, and, as in the case of Africa, by a long list in



alphabetical order of all the known American tribes and their languages. Each volume has a good useful index, a most important item in a work of this nature.

The abundant equipment of maps adds greatly to the value of the volumes, as the numerous illustrations do to their interest.

### OUR BOOK SHELF

*Geometry in Modern Life, being the Substance of Two Lectures on Useful Geometry, given before the Literary Society at Eton.* By J. Scott Russell, F.R.S. (Eton: Williams and Son, 1878.)

IN a recent number (*NATURE*, vol. xviii. p. 263) we took occasion to suggest that the usefulness of a school scientific society might still further be increased by calling in the assistance of scientific men to deliver lectures which should be open not merely to the members, but also to a wider circle. The literary Society at Eton has, we believe, adopted this plan on very many occasions; recently it will be remembered that Mr. Gladstone addressed the society on Homer. Mr. Russell's lecture is a full one, and on the lines which it follows, a useful one. "Geometry is a pure science, gives logical training, is a discipline of thought, is an instrument of human culture, and has high educational value. But geometry is equally the development of a method pervading nature; its mastery gives man a power to govern matter. The training which enables him to comprehend the mechanism of the universe, enables him also to make creations of his own in harmony with those greater designs of which his own are but a small portion. These two uses of geometric education the one purely gymnastic, the other practical and technic, may be so combined that each shall aid and not impede the other. The order, number, and measure which pervade the universe can be easily brought within the scope of elementary education, and so form the fit preparation for scientific observation and experiment in later life, by means of which the standard of application of abstract truths to matter and events in human life are determined and made familiar. But the one learning cannot be too soon begun, nor the other too long continued, and each is a material aid to the other." This extract shows the author's views, which he has worked out in some detail. Starting from the Greek geometry, he passes on to useful geometry: its applications to land-measuring, trigonometry, navigation. He touches also on numbers, goes on to symmetry, harmony, melody, then to light, shape, and shadow. He closes with a chapter on matter, force, and motion. To sum up, the whole furnishes a quantity of illustration from an eminent practical man, which is likely to be profitable to teachers in search of such illustration—to allure the "what's the use of it?" boys who form a part of every mathematical master's geometrical classes.

*Die Geologie der Gegenwart.* Dargestellt und beleuchtet von Bernhard von Cotta. Fünfte umgearbeitete Auflage. (Leipzig: J. J. Weber, 1878.)

THE appearance of a fifth edition of von Cotta's well-known work is a sufficient proof of its popularity—a popularity which, in spite of some unfortunate drawbacks to its usefulness, we cannot but regard as being well deserved. Since the first appearance of the volume in 1866 it has been steadily growing in bulk, and in the present edition the author has brought his work up to date by noticing the principal contributions which have recently been made to geological science. Among such additions we may point to his notices of the method of study of rocks by the means of the microscope, of the new classification and nomenclature of the stratified rocks suggested by Carl Mayer, of the results of the

*Challenger* expedition, of the latest speculations on the causes of volcanic activity and the nature of meteorites, and of Croll's theory of the recurrence of glacial periods. The coloured frontispiece now added to the work, we can scarcely regard as an improvement, seeing that it tends to perpetuate those views of the restriction of certain classes of volcanic products to distinct geological periods, which, though so frequently insisted upon by German petrographers, do not appear to be sustained by extended observation in the field.

*Ocean and Her Rulers.* By Alfred Elwes. New and Revised Edition. (London: Griffith and Farran, 1878.)

*Under the Red Ensign.* By Thomas Gray. (London: Simpkin, Marshall, and Co., 1878.)

THESE are two good books, each in its way. The former is a narrative of the nations which have from the earliest ages had dominion over the sea, comprising a brief history of navigation down to the present time. It is evidently intended for boys and is likely to interest the more thoughtful of them and send them to works which will give a more detailed account of the peoples whose exploits by sea are told, and lead them to take an interest in geographical discovery. The reading is rather miscellaneous and unconnected, and the information sometimes undigested, but as a whole the book is useful and interesting.

Mr. Gray's booklet is one that will prove thoroughly useful to parents intending to send their boys to sea, as well as to the boys themselves. Mr. Gray knows well what he writes about, and the information and advice he gives as to the choice of a sea-life as a calling, how to get a boy launched into it, what kind of ship to choose, how the boy should conduct himself, what books he should read, and a multitude of other points are admirable. We are glad to see that among the books he recommends a large proportion are standard scientific works.

*Memoir of the late Alfred Smee, F.R.S., by his Daughter. With a Selection from his Miscellaneous Writings.* (London: George Bell and Sons, 1878.)

MR. SMEE was in many respects a remarkable man, and this readable memoir by his daughter will, we doubt not, be acceptable to those who knew him personally or through his works. An Appendix contains about forty papers, letters, pamphlets, &c.; these occupy quite two-thirds of the volume.

### LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

### An Intra-Mercurial Planet

WITH reference to the important announcement, by telegram, of the discovery by Mr. Watson of an intra-Mercurial planet during the late eclipse of the sun, it may be worth remarking that the position of  $\theta$  Cancri agrees very well with that given in the telegram published in *NATURE*, and that there may be a possibility that the object observed is in reality this star. The position of the suspected planet recorded by Mr. Watson is R.A. 8h. 26m., and N.P.D.  $72^\circ$ ; the apparent place of the star, computed from the mean place given in the new Nine-Year Catalogue for 1872, January 1, is, for July 29, R.A. 8h. 24m. 40s., and N.P.D.  $71^\circ 29' 40''$ . The magnitude of this star is, however, smaller than that given by Mr. Watson, that in the British Association Catalogue being  $5\frac{1}{2}$ , and that in Argelander's